A POSSIBLE LUNAR INFLUENCE UPON THE VELOCITY OF THE WIND AT KIMBERLEY.

(THIRD PAPER.)

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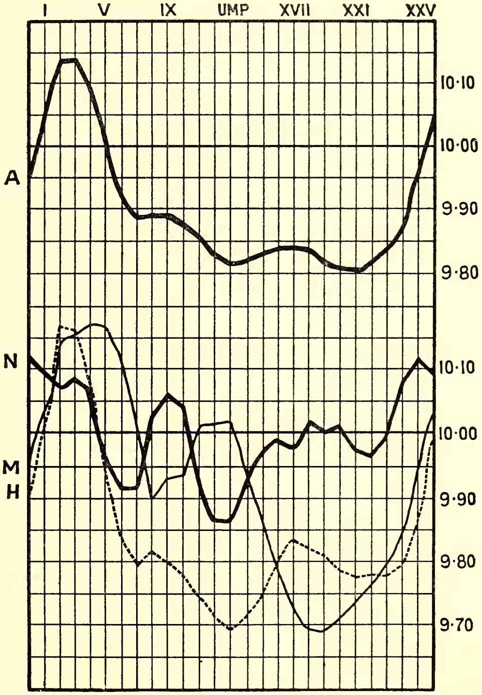
(With one Text-figure.)

The present paper deals with the variations in the velocity of the wind when the moon is near apogee. The observation period extends from April,



Velocity Variation Curves.
A. Apogee curve. N. "Noon" apogee curve. M. "Midnight" apogee curve. H. "Horizon" apogee curve.

1897, to December, 1919, comprising 298 apogees. The method followed is the same as that of the previous paper, departures from the hourly means being arranged in hours of the lunar day. This is no doubt a better way of dealing with the matter (though a much more laborious one) than that of merely tabulating the velocities themselves, even though it may not be so necessary as in the case of perigee, seeing that the moon's culminations at apogee are fairly evenly distributed over the hours of the solar day. The observations made use of are those for the day of apogee together with those of the day before and the day after, 894 days in all.

Wind Velocity Variation at Apogee in Miles an Hour.

Hour.	Mean apogee.	"Noon" apogee.	"Midnight" apogee.	"Horizon" apogee.
L.M.P	10·054	10·093	10·036	10·045
II	10·140	10·071	10·146	10·167
III	10·140	10·080	10·151	10·160
IV	10·093	10·069	10·167	10·067
V	10·002	9·957	10·164	9·945
VI	9·925	9·912	10·111	9·841
VII	9·881	9·923	10·016	9·797
VIII	9·882	10·025	9·900	9·810
IX	9·890	10·053	9·929	9·799
X	9·876	10·037	9·936	9·776
XI	9·854	9·926	10·015	9·744
XII	9·825	9·862	10·017	9·715
U.M.P	9·814	9·863	10·019	9·694
XIV	9·823	9·935	9·952	9·712
XV	9·828	9·973	9·860	9·750
XVI	9·839	9·986	9·778	9·804
XVII	9·839	9·980	9·727	9·831
XVIII	9·832	10·014	9·694	9·818
XIX	9·821	9·998	9·692	9·805
XX	9·817	10·007	9·707	9·786
XXI	9·808	9·976	9·731	9·771
XXII	9·817	9·969	9·762	9·777
XXIII	9·829	9·989	9·791	9·777
XXIV	9·869	10·084	9·832	9·792
L.M.P	9·964	10·114	9·929	9·915
Mean	9·899	9·996	9·922	9·844
Range	0·332	0·252	0·475	0·473
No.	894	204	225	465

In the above table column 1 indicates the hours of the lunar day.

Column 2 gives the hourly means of the deviations $V - v + 10$ for all the 894 days.

Column 3 gives the means of the deviations when the moon near apogee culminates between IX and XV.

Column 4 the same for culminations between XXI and III.

Column 5 the same for the remaining hours.

These "noon" and "midnight" culminations have been extended over a six-hour range, instead of over the four-hour range (X to XIV, and XXII to II) used for perigee terms, in order to give a larger number of observations for discussion, and so smoother curves, for those culminations. But of course such an extension of the time limits must impart something of the "horizon" character to the "noon" and "midnight" curves deduced.

As before, all the tabular numbers have been smoothed in threes.

The curves shown in the diagram are best studied by comparison with the perigee curves of the second paper. Generally they show the same turning-points as the perigee curves, but somewhat lagging, and the moonrise minimum is not so pronounced, *e. g.*:

"Noon" Curves.

Maxima:	Perigee	XXII	XI	XVI
	Apogee	L.M.P	IX	XVIII
Minima:	Perigee	IV	XII	XX
	Apogee	VI	XII	XXII

"Midnight" Curves.

Maxima:	Perigee	L.M.P	X	XX
	Apogee	IV	U.M.P	
Minima:	Perigee	VI	XVI	
	Apogee	VIII	XIX	

"Horizon" Curves.

Maxima:	Perigee	II	VIII	XIV
	Apogee	II	VIII	XVII
Minima:	Perigee	VI	XI	XX
	Apogee	VIII	U.M.P	XXI

Mean Curves.

Maxima:	Perigee	XXIV	IX	XVI
	Apogee	II	IX	XVII
Minima:	Perigee	VI	XII	XIX
	Apogee	VII	U.M.P	XXI

It is an interesting fact that all the apogee curves average lower on the scale than the corresponding perigee ones do, mean values in miles an hour being—

	Perigee.	Apogee.	Difference P.—A.
"Noon"	10·132	9·996	·136
"Midnight"	10·036	9·922	·114
"Horizon"	9·882	9·844	·038
Mean	9·994	9·899	·095

Further, while the velocity tends to rise when the moon is above the horizon at perigee, it tends to fall at apogee. And while the perigee curves end the lunar day at a higher level than they started at, the apogee curves run down. The relatively large range of variation shown by the apogee curve is probably due to this circumstance.

In their general tendency the results so far obtained are pretty much what might have been expected; but the actual ranges of velocity are greater than I looked for, reasoning from the thermodynamical analogy of the semidiurnal oscillation of barometric pressure. Their acceptance would demand for the purely dynamical problem of the air tide a lively circulation throughout the whole depth of atmosphere. On the negative side of the account it may be claimed that at the least if, at a place so favourably situated as Kimberley is for a research of this kind, the moon at its best cannot create a range of wind velocity of more than 0·7 mile an hour in the course of a whole day, then how can it possibly promote the storm and tempest attributed to it by the weather prophets?

Again I have to thank my wife for her assistance.